ENVIRONMENTAL INFLUENCES ON NUTRITIONAL PHYSIOLOGY AND PERFORMANCE OF BEEF CATTLE WINTER GRAZING NORTHERN GREAT BASIN RANGELANDS

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Winter grazing studies conducted in recent years have provided general information in regard to environmental influences on nutrition. The winter environment is one of the most important variables to be considered in a winter grazing program, and if severe, can have a significant (and potentially serious) impact on animal performance. Grazing animals have been shown to reduce their grazing activity and decrease intake of range forage during severe environmental stresses. Animal response to various environmental variables (temperature, precipitation, wind speed) on a short and long-term basis is still not clear. We have recently completed a study that should describe the mechanisms by which animals respond to the environment on a day-to-day basis. We also hope to be able to show the type and magnitude of environmental change, which is needed to cause nutritional, physiological and behavioral changes in the animal.

During the winter of 1992-93, 24 mature, pregnant Hereford X Angus cows were individually fed, beginning at 8 a.m. each day, 4.4 lb./hd/d of a corn-cottonseed meal supplement (20% CP), which also contained 2.0 gms of chromic oxide, and an indigestible marker used to determine fecal output. Feeding began on November 11, 1992. Seven ruminally and esophageally fistulated steers were kept with the cows and fed the same amount of supplement. The sampling period began on November 23. Fecal grab samples were obtained daily from each cow. Also at this time, all cows were fitted with vibracorders and pedometers in order to measure grazing behavior. Cow weights and condition scores were obtained on each Monday of the study. At this time, blood samples were also obtained to determine blood urea N and cortisol levels. Every other week, three of the steers were fitted with total collection bags in order to validate the recovery of the marker. On weeks when the bags were not used, the remaining four steers were originally intended to be used on four consecutive days to obtain diet quality samples. However, due to excessive snow cover, this only happened one time, in early December. These four steers were ruminally evacuated on the fifth day of these weeks, in order to determine digesta kinetics (ruminal fill and passage rates). Intake estimates will be made on a daily basis, based on daily fecal output values and weekly diet quality values. Digesta kinetics will be used to adjust fecal output estimates to the time of environmental events. Daily intake estimation is an untested approach in a grazing situation; therefore, we hope this procedure provides encouraging results.

Due to excessive snow cover, we began feeding grass straw to the cows on December 7. The straw was provided in sufficient amounts to ensure ad libitum intakes. Following the onset of straw feeding, cows greatly curtailed their grazing activity; in fact, they spent all their time in the feeding ground. Beginning in early January, on two consecutive days of every other week, cows were visually observed to determine when they were eating straw and when they were eating snow. The animals had not been to water since mid-December, and had been using snow as their water source. The observation was done in order to separate straw and snow eating events on the grazing charts. The study was terminated on February 22; extreme snow drifting had closed the roads into the pasture and feeding facility, causing us to end the study one week ahead of time.

A weather station in the study pasture recorded environmental effects such as wind speed and direction, temperature, solar radiation, and precipitation. While the amount and the persistence of the snow cover forced us to change the study from its original design, we still hope to get some new and valuable information regarding nutritional response to environmental stress. This study should be completely analyzed and published by January of 1994.